A. In the claims:

Please amend the claims as follows:

1.(Currently amended) A process of making an electrical device, the process including:

~~producing~~ removing a portion of a dielectric material ~~comprised of~~ in producing cavities in a ~~top~~ surface of a ~~with cavities~~ remaining ~~from removing a~~ portion of the dielectric material; and

building up a conductive layer in ~~on the dielectric material to fill~~ the cavities ~~to~~ in forming teeth set in and under the ~~top~~ surface ~~of the dielectric material~~ and in forming a portion of circuitry of ~~the~~ an electrical device, wherein a plurality of the cavities are obtuse with respect to the ~~top~~ surface, and a plurality of the cavities are at least 1 tenth of a mil deep and less than 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the remaining portion of the dielectric material, and one of the teeth engages the remaining ~~a~~ portion of the dielectric material at the slope.

2. (Previously presented) The process of claim 1, wherein the removing of the portion is sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%.

3. (Currently amended) The process of claim 2, wherein the building up is sufficient to produce a peel strength greater than ~~the~~ a peel strength ~~than that~~ of a single desmear process.

4. (Currently amended) The process of claim 1, wherein the ~~removing~~ producing cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in produceing a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening.

5. (Currently amended) The process of claim 1, wherein the ~~removing~~ producing cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in produceing a peel strength greater than a peel strength that would be produced by a single desmear process, and the forming teeth includes forming a plurality of hooked teeth.

6. (Currently amended) The process of claim 1, wherein the ~~removing~~ producing cavities does not include physical roughening, and the building up the conductive layer includes filling the cavities sufficiently that separation of the conductive layer from the remaining portion of the dielectric material requires destroying integrity of at least one of the conductive layer and the remaining portion of the dielectric material.

7. (Currently amended) A process of making an electrical device, the process including:

producing, from a dielectric material, a surface including cavities remaining from removing a portion of the dielectric material; and

building up a conductive layer ~~on~~ in the ~~dielectric material to fill the~~ cavities ~~to~~ in forming ~~a surface of~~ substantially angular teeth set in ~~the~~ a remaining portion of the dielectric

material and in forming a portion of circuitry of ~~the~~ an electrical device, and wherein a sample of the circuitry has at least 20% of the teeth being at least 1 tenth of a mil deep and less than 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface ~~of the dielectric material~~, and one of the teeth engages ~~a portion of~~ the remaining portion of the dielectric material at the slope.

8. (Previously presented) The process of claim 7, wherein the removing of the portion is sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%.

9. (Currently amended) The process of claim 7, wherein the removing is such that forming the cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in producing a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, and the forming substantially angular teeth includes forming a plurality of substantially angular teeth that mechanically grip the remaining portion of the dielectric material, more than by adherence.

10. (Currently amended) The process of claim 7, wherein the removing is such that forming the cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in producing a peel strength greater than a peel strength that would be produced by a single desmear process, and the forming substantially angular teeth includes forming a plurality of substantially angular hooked

teeth.

11. (Currently amended) The process of claim 7, wherein the removing is such that forming the cavities does not include physical roughening, and the ~~building up the conductive layer includes filling the cavities sufficiently~~ forming substantially angular teeth is such that separation of the conductive layer from the remaining portion of the dielectric material would destroy integrity of at least one of the conductive layer and the remaining portion of the dielectric material.

12. (Currently amended) A process of making an electrical device, the process including:

building up a conductive layer of material on a surface of a layer of dielectric material, the layers joined in a saw-tooth manner made of both materials in an interlocking bite ~~to~~ in forming a portion of circuitry of ~~the~~ an electrical device, the conductive layer ~~comprised of~~ forming teeth~~, and wherein~~ such that a sample of the circuitry has a frequency of the teeth sufficient to provide at least 5,000 of the teeth per linear inch, the teeth set respectively in cavities of the bite, and ~~wherein~~ the sample of the circuitry has at least 20% of the teeth being at least 1 tenth of a mil deep and less than 2 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface ~~of the dielectric material~~, and one of the teeth engages a portion of the dielectric material at the slope.

13. (Currently amended) The process of claim 12, further including providing ~~wherein the electrical device comprises~~ a micro via interconnect for the circuitry.

14. (Currently amended) The process of claim 12, wherein, prior to the building up, the layer of the dielectric material has a surface gloss such that a surface gloss measurement at an angle of 60 degrees ~~of~~ is less than 10%.

15. (Currently amended) The process of claim 12, wherein the removing is such that forming the cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in producing a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, such that a plurality of the teeth mechanically grip the layer of dielectric material, more than by adherence, at the surface contact area.

16. (Currently amended) The process of claim 12, wherein the producing the interlocking bite does not include physical roughening, and the building up the conductive layer includes building up the conductive layer in ~~to~~ produceing a peel strength greater than a peel strength that would be produced by a single desmear process, such that the forming teeth includes forming a plurality of hooked teeth.

17. (Currently amended) The process of claim 12, wherein the ~~building up the conductive layer includes building up the conductive layer sufficiently~~ forming teeth is such that separation of the layers would destroy integrity of at least one of the conductive layer and the dielectric material.

18. (Currently amended) A process of making an electrical device, the

process including:

building up a conductive layer ~~to~~ in filling undercuttings with respect to a surface of a dielectric material~~,~~ so as to form a plurality of teeth in cavities, ~~the undercuttings being~~ some of the teeth being obtuse to the surface and in the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, ~~to~~ in forming a portion of circuitry of ~~the~~ an electrical device,

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

19. (Canceled)

20. (Currently amended) A process of making an electrical device, the process including:

producing ~~a dielectric material with~~ a surface with cavities remaining after removing ~~an other~~ portion of ~~the~~ a dielectric material sufficient to produce a surface with a surface gloss measurement at an angle of 60 degrees of less than 10%; and

building up a conductive layer ~~to fill~~ in the cavities ~~and~~ in forming electrical device circuitry, wherein ~~a plurality of the cavities is obtusely angled and~~ the building up of the conductive layer includes forming teeth in the cavities and in the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface ~~of the dielectric material~~, and one of the teeth engages a portion of the dielectric material at the slope.

21. (Currently amended) The process of claim 20, wherein a plurality of the cavities is obtusely angled ~~and the building up the conductive layer includes forming teeth~~.

22. (Currently amended) The process of claim 20, wherein ~~the removing~~ producing the cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer ~~to~~ in produceing a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, and the forming teeth includes forming a plurality of teeth that mechanically grip, more than by adherence, the surface contact area.

23. (Currently amended) The process of claim 20, wherein the ~~removing~~ producing cavities does not include physical roughening, and the building up the conductive layer fills the cavities sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and the forming teeth includes forming a plurality of hooked teeth.

24. (Currently amended) The process of claim 20, wherein the ~~removing~~ producing cavities does not include physical roughening, and the building up the conductive layer includes building up the conductive layer sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of at least one of the conductive layer and the dielectric material.

25. (Currently amended) A process ~~for~~ of making an electrical device, the process including:

forming electrical device circuitry with teeth produced by building up a conductive layer ~~on~~ in cavities of a dielectric material that has an exterior surface and ~~at~~ a dielectric surface area greater than a dielectric surface area that would be produced by a single pass roughening, wherein a sample of the circuitry has at least 20% of the teeth that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the exterior surface ~~of the dielectric material~~, and one of the teeth engages a portion of the dielectric material at the slope.

26. (Currently amended) The process of claim 25, further including providing ~~wherein the electrical device comprises~~ a micro via interconnect for the circuitry.

27. (Currently amended) The process of claim 25, ~~wherein the building up the conductive layer includes building up the conductive layer in~~ further including producing the cavities ~~formed~~ without physical roughening and sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and such that a plurality of the teeth are hooked teeth.

28. (Currently amended) The process of claim 25, wherein the conductive layer is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of at least one of the conductive layer and the dielectric material.

29. (Currently amended) A process of making an electrical device, the process including:

combining a dielectric material with a conductive layer ~~to~~ in forming a portion of circuitry of ~~the~~ an electrical device, said combining being carried out with means for joining the conductive layer to the dielectric material, ~~———————————~~

~~———~~the means including teeth built up on the dielectric material and angled sufficiently ~~for~~ to mechanically grip~~ping~~ the dielectric material in three dimensions, wherein a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the teeth is in one of a plurality of cavities that includes an upgrade slope with respect to ~~the~~ an etched surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

30. (Currently amended) A process of making an electrical device, the process including:

combining a dielectric material with means for joining a conductive layer built up on the dielectric material sufficient to produce a peel strength greater than a peel strength that would be produced by a single desmear process, the conductive layer forming a portion of circuitry, wherein

the combining is carried out with the means for joining comprised of teeth, a plurality of the teeth being obtuse to a ~~top~~ surface of the dielectric material and within cavities in the range of at least ~~one~~ 1 tenth ~~are within a range~~ of a mil deep to 1.75 of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

31. (Canceled)

32. (Currently amended) A process of making an electrical device, the process including:

forming electrical device circuitry by building up a conductive layer on a surface of dielectric material so as to produce a peel strength greater than a peel strength that would be produced by a single desmear process, wherein

~~———————~~a sample of the circuitry includes at least 20% of ~~the~~ teeth that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and ~~———————~~

~~———————~~wherein at least one of ~~the~~ a plurality of cavities, respectively adjacent to the teeth, includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

33.(Previously presented) The process of claim 32, wherein the electrical device comprises a circuit board.

34. (Currently amended) The process of claim 32, wherein the building up the conductive layer includes building up the conductive layer sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of at least one of the conductive layer and the dielectric material.

35. (Currently amended) A process of making an electrical device, the process including:

producing a ~~dielectric material comprising a top~~ surface remaining from removing a portion of ~~the~~ a dielectric material; and

applying means for mechanically gripping a conductive layer to the surface ~~of the dielectric material~~ so that a conductive layer is burrowed in and under the ~~top~~ surface ~~of the dielectric material~~, wherein the conductive layer forms a portion of circuitry of ~~the~~ an electrical device, wherein the applying is carried out with the means for mechanically gripping comprising teeth, and a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 2 tenths of a mil deep, and

wherein at least one of ~~the~~ a plurality of cavities, respectively adjacent to the teeth, includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

36. (Canceled)

37. (Currently amended) A process of making an electrical device, the process including:

forming electrical device circuitry by building up a conductive layer on a dielectric material sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the conductive layer and of the dielectric material, wherein

the building up the conductive layer includes forming teeth~~, and the teeth~~ that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of ~~the~~ a plurality of cavities, respectively adjacent to the teeth, includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

38. (Canceled)

39. (Currently amended) A process of making an electrical device, the process including:

building up a conductive layer on a dielectric material sufficient to produce ~~with~~ a surface gloss measurement at an angle of 60 degrees of less than 10% ~~to~~, in forming circuitry of ~~the~~ an electrical device, wherein

the building up the conductive layer includes producing teeth~~, and the teeth that are~~ within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of ~~the~~ a plurality of cavities, respectively adjacent to the teeth, includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

40. (Canceled)

41. (Currently amended) The process of claim 39, wherein building up the conductive layer includes building up the conductive layer sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the conductive layer.

42. (Currently amended) The process of claim 39, wherein the building up the conductive layer includes building up the conductive layer sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the dielectric material.

43. (Currently amended) The process of claim 39, wherein the building up the conductive layer includes building up the conductive layer sufficiently that separation of the

conductive layer from the dielectric material would destroy integrity of the conductive material and the dielectric material.

44. (Currently amended) A process of making an electrical device, the process including:

combining a dielectric material with means for joining a conductive layer built up on a conductive coating on the dielectric material at a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, the conductive layer forming a portion of circuitry, wherein the combining is carried out with the means for joining comprised of ~~comprised of~~ teeth~~, and the teeth that are~~ within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of ~~the~~ a plurality of cavities, respectively adjacent to the teeth, includes an upgrade slope with respect to ~~the~~ an etched surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

45. (Canceled)

46. (Currently amended) A process of making an electrical device, the process including:

combining a dielectric material with means for joining a conductive layer built up on the dielectric material sufficiently that separation of the dielectric material from the conductive layer requires destroying integrity of at least one of the conductive layer and the dielectric material, said means for joining comprising filled cavities that form a portion of circuitry of ~~the~~ an electrical device, wherein the ~~combining is carried out with the~~ filled cavities

comprising teeth, the teeth that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the an etched surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

47. (Canceled)

48. (Currently amended) The process of any one of claims 1, 7, 11, 18, 20, 25, 29, 30, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 5,000 said teeth per linear inch.

49. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 10,000 said teeth per linear inch.

50. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 15,000 said teeth per linear inch.

51. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20,

25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 25,000 said teeth per square inch.

52. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 100,000 said teeth per square inch.

53. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes a frequency of the teeth sufficient to provide at least 200,000 said teeth per square inch.

54. (Previously presented) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 20% of the teeth are shaped to mechanically grip the dielectric material.

55. (Currently amended) The process of any one of claims 1, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 50% of the teeth that are obtuse shaped.

56. (Currently amended) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 20% of the teeth that are within the range of at least 1 tenth of a mil deep to 1.75 tenths of a mil deep.

57. (Previously presented) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 50% of the teeth that are within the range of at least 1 tenth of a mil deep to 1.75 tenths of a mil deep.

58. (Previously presented) The process of any one of claims 1, 3, 7, 12, 18, 20, 29, 30, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 20% of the teeth that are within the range of 1 tenth of a mil deep to 1.5 tenths of a mil deep.

59. (Previously presented) The process of any one of claims 1, 2, 3, 7, 12, 18, 20, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 50% of the teeth that are within the range of 1 tenth of a mil deep to 1.5 tenths of a mil deep.

60. (Previously presented) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 20% of the teeth that are in the range of 1.5 tenths of a mil deep to 1.75 tenths of a mil deep.

61. (Previously presented) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 44, or 46 wherein:

a sample of the circuitry includes at least 50% of the teeth that are in the range of 1.5 tenths of a mil deep to 1.75 tenths of a mil deep.

62. (Currently amended) The process of claim 48, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

63. (Currently amended) The process of claim 49, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

64. (Currently amended) The process of claim 50, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

65. (Currently amended) The process of claim 51, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

66. (Currently amended) The process of claim 52, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers

comprising said teeth and another of said layers comprising correspondingly made teeth.

67. (Currently amended) The process of claim 53, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

68. (Currently amended) The process of claim 54, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

69. (Currently amended) The process of claim 55, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

70. (Currently amended) The process of claim 56, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

71. (Currently amended) The process of claim 57, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

72. (Currently amended) The process of claim 58, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers

comprising said teeth and another of said layers comprising correspondingly made teeth.

73. (Currently amended) The process claim 59, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

74. (Currently amended) The process of claim 60, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

75. (Currently amended) The process of claim 61, further including configuring the circuitry of the electrical device as multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising correspondingly made teeth.

76. (Currently amended) The process of claim 48, further including configuring the circuitry as of double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

77. (Currently amended) The process of claim 49, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

78. (Currently amended) The process of claim 50, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another

side comprising correspondingly made teeth.

79. (Currently amended) The process of claim 51, further including configuring the circuitry as of double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

80. (Currently amended) The process of claim 52, further including configuring the circuitry as of double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

81. (Currently amended) The process of claim 53, further including configuring the circuitry as of double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

82. (Currently amended) The process of claim 54, further including configuring the circuitry as of double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

83. (Currently amended) The process of claim 55, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

84. (Currently amended) The process of claim 56, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another

side comprising correspondingly made teeth.

85. (Currently amended) The process of claim 57, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

86. (Currently amended) The process of claim 58, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

87. (Currently amended) The process of claim 59, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

88. (Currently amended) The process of claim 60, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

89. (Currently amended) The process of claim 61, further including configuring the circuitry as double sided circuitry, one side comprising said teeth and another side comprising correspondingly made teeth.

90. (Previously presented) A product produced by the process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 35, 32, 37, 44, or 46.

91. (Currently amended) An electrical device including:

a dielectric material ~~having~~ comprising a ~~top~~ surface with cavities remaining from removal of a portion of the dielectric material;

a conductive layer built up on the dielectric material so as to fill the cavities ~~to~~ and form teeth set in and under the ~~top~~ surface of the dielectric material; and wherein~~:~~

the conductive layer is a portion of circuitry of ~~the~~ an electrical device, and a plurality of the cavities are obtuse with respect to the ~~top~~ surface and are at least 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

92. (Currently amended) The device of claim 91, wherein, prior to the conductive layer of material being built up thereon, the surface with the cavities has a gloss ~~removal of the portion is~~ sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%.

93. (Currently amended) The device of claim 91, wherein the electrical device comprises a micro via interconnect ~~for the circuitry~~.

94. (Currently amended) The device of claim 91, wherein the ~~removal does not include physical roughening, and the conductive layer has~~ teeth have a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single

pass roughening, and some of the teeth comprise hooked teeth.

95. (Currently amended) The device of claim 91, wherein the ~~removal does not include physical roughening, and the~~ conductive layer fills ~~in~~ the cavities sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and some of the teeth mechanically grip the dielectric material, more than by adherence.

96. (Currently amended) The device of claim 91, wherein the conductive layer fills ~~in~~ the cavities sufficiently that separation of the conductive layer from the dielectric material requires destroying integrity of at least one of the conductive layer and the dielectric material.

97. (Currently amended) An electrical device including:

a dielectric material ~~having~~ comprising a surface with cavities remaining ~~from~~ after removal of ~~a portion~~ some of the dielectric material;

a conductive layer built up on the dielectric material so as to fill the cavities ~~to~~ and form ~~a surface of~~ substantially angular teeth set in the dielectric material; and wherein~~:~~

the conductive layer is a portion of circuitry of ~~the~~ an electrical device, and a plurality of the teeth are at least 1 tenth of a mil deep and less than 1.75 tenths of a mil deep, ~~;~~and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

98. (Currently amended) The device of claim 97, wherein, prior to the conductive layer of material being built up thereon, the surface with the cavities has a gloss ~~removal of the portion is~~ sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%.

99. (Currently amended) The device of claim 97, wherein the ~~removal does not include physical roughening, and the conductive layer has~~ teeth have a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, and some of the teeth comprise hooked teeth.

100. (Currently amended) The device of claim 97, wherein the ~~removal does not include physical roughening, and~~ the conductive layer fills ~~in~~ the cavities sufficiently so as to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and some of the teeth mechanically grip the dielectric material, more than by adherence.

101. (Currently amended) The device of claim 97, wherein the conductive layer built up is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of at least one of the conductive layer and the dielectric material.

102. (Currently amended) An electrical device including:

a conductive layer of material built up on a surface of a layer of a dielectric

material, the layers joined in a saw-tooth manner made of both materials in an interlocking bite; wherein

the conductive layer is a portion of circuitry of ~~the~~ an electrical device, the conductive layer is comprised of teeth~~, and~~ such that a sample of the circuitry has a frequency of the teeth sufficient to provide at least 5,000 of the teeth per linear inch, the teeth the teeth set respectively in cavities of the bite and a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface ~~of the dielectric material~~, and one of the teeth engages a portion of the dielectric material at the slope.

103. (Currently amended) The device of claim 102, wherein the electrical device comprises a micro via interconnect ~~for the circuitry~~.

104. (Currently amended) The device of claim 102, wherein, prior to the conductive layer of material being built up thereon, the ~~dielectric material has~~ surface has a gloss sufficient to provide a surface gloss measurement at an angle of 60 degrees of less than 10% ~~prior to the conductive layer of material being built up thereon~~.

105. (Currently amended) The device of claim 102, wherein the ~~conductive layer has~~ teeth have a dielectric surface contact area that~~, without physical roughening,~~ is greater than a dielectric surface contact area that would be produced by a single pass roughening, and some of the teeth comprise hooked teeth.

106. (Currently amended) The device of claim 102, wherein the ~~interlocking bite is formed without physical roughening, and the~~ conductive layer built up is built up sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and some of the teeth mechanically grip the dielectric material, more than by adherence.

107. (Currently amended) The device of claim 102, wherein the conductive layer built up is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of at least one of the conductive layer and the dielectric material.

108. (Currently amended) An electrical device including:

a conductive layer ~~including a surface~~ built up so as to fill undercuttings with respect to a surface of ~~in~~ a dielectric material so as to form teeth in cavities, a plurality of the undercuttings being obtuse to the surface ~~and at least 1.5 tenths of a mil deep~~, wherein

the conductive layer is a portion of circuitry of ~~the~~ an electrical device, ~~wherein the conductive layer built up to fill the undercuttings is comprised of teeth, the~~ and a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

109. (Canceled)

110. (Currently amended) An electrical device including:

a dielectric material surface with cavities ~~remaining after removal of a portion of the dielectric material~~ sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%; and

electrical device circuitry comprised of a conductive layer built up so as to fill in the cavities and form teeth, wherein a plurality of the cavities are obtusely angled with respect to the surface, and ~~the conductive layer build up to fill the cavities is comprised of teeth,~~ a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

111. (Canceled)

112. (Currently amended) The device of claim 110, wherein the teeth have ~~conductive layer has~~ a dielectric surface contact area that~~, without physical roughening,~~ is greater than a dielectric surface contact area that would be produced by a single pass roughening, and some of the teeth comprise hooked teeth.

113. (Currently amended) The device of claim 110, wherein the ~~removal does not include physical roughening, and the~~ conductive layer fills in the cavities sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and some of the teeth mechanically grip the dielectric material, more than by

adherence.

114. (Currently amended) The device of claim 110, wherein the conductive layer is sufficiently built up that separation of the conductive layer from the dielectric material destroys integrity of at least one of the conductive layer and the dielectric material.

115. (Currently amended) An electrical device including:

a dielectric material; and

electrical device circuitry comprising a conductive layer built up on the dielectric material at a dielectric surface having an area greater than a dielectric surface area that would be produced by a single pass roughening; and wherein

the conductive layer is comprised of a plurality of the teeth within cavities that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

116. (Currently amended) The device of claim 115, wherein the electrical device comprises a micro via interconnect ~~for the circuitry~~.

117. (Currently amended) The device of claim 115, wherein the conductive layer built up is built up in the cavities ~~formed without physical roughening and~~ sufficiently to produce a peel strength greater than a peel strength that would be produced by a single desmear process, and some of the teeth mechanically grip the dielectric material, more than by

adherence.

118. (Currently amended) The device of claim 115, wherein the conductive layer built up is built up sufficiently that separation of the conductive layer from the dielectric material requires destroying integrity of at least one of the conductive layer and the dielectric material.

119. (Currently amended) An electrical device including:

a dielectric material comprising a surface;

a conductive layer forming a portion of circuitry of ~~the~~ an electrical device; and

means for joining the conductive layer to the dielectric material, the means including a structuring of teeth built up on the dielectric material and comprised of the conductive layer and angled sufficiently for mechanically gripping the dielectric material in three dimensions, wherein a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

120. (Currently amended) An electrical device including:

a dielectric material comprising a surface; and

means for joining a conductive layer built up on the dielectric material so as to produce a peel strength greater than a peel strength that would be produced by a single desmear process, wherein the conductive layer is a portion of circuitry, and portions of the

conductive layer are in cavities obtuse to a top surface of the dielectric material ~~and at least 1 tenth of a mil deep~~, wherein the means for joining is comprised of teeth, and a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

121. (Canceled)

122. (Currently amended) An electrical device including:

a dielectric material; and

electrical device circuitry comprising a conductive layer built up on a surface of the dielectric material so as to produce teeth set in cavities and a peel strength greater than a peel strength that would be produced by a single desmear process; and wherein

a plurality of the teeth are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

123. (Previously presented) The device of claim 122, wherein the electrical device comprises a circuit board.

124. (Currently amended) The device of claim 122, wherein the conductive layer built up is built up sufficiently that separation of the conductive layer from the dielectric

material would destroy integrity of at least one of the conductive layer and the dielectric material.

125. (Currently amended) An electrical device including:

a dielectric material having a ~~top~~ surface ~~with a surface~~ remaining from removal of a portion of the dielectric material; and

means for mechanically gripping a conductive layer to the surface of the dielectric material so that the conductive layer is burrowed in and under the top surface of the dielectric material, wherein the conductive layer forms a portion of circuitry of ~~the~~ an electrical device, wherein the means for mechanically gripping is comprised of teeth, and a plurality of the teeth ~~that~~ are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

126. (Canceled)

127. (Currently amended) An electrical device including:

a dielectric material; and

electrical device circuitry comprising a conductive layer built up on the dielectric material sufficiently that separation of the conductive layer from the dielectric material would require destroying integrity of the conductive layer and of the dielectric material, wherein the conductive layer is comprised of teeth in cavities, a plurality of the teeth being ~~that are~~ within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

128. (Canceled)

129. (Currently amended) An electrical device including:

a dielectric material having a surface with a gloss sufficient for surface gloss measurement at an angle of 60 degrees of less than 10%; and

circuitry of ~~the~~ an electrical device comprised of a conductive layer on the dielectric material, wherein the conductive layer is comprised of teeth in cavities, a plurality of the teeth ~~that are~~ being within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

130. (Canceled)

131. (Currently amended) The device of claim 129, wherein the conductive layer built up on the dielectric material is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the conductive layer.

132. (Currently amended) The device of claim 129, wherein the conductive

layer built up on the dielectric material is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the dielectric material.

133. (Currently amended) The device of claim 129, wherein the conductive layer built up on the dielectric material is built up sufficiently that separation of the conductive layer from the dielectric material would destroy integrity of the conductive layer and the dielectric material.

134. (Currently amended) An electrical device including:

a dielectric material having a surface; and

means for joining a conductive layer built up on the dielectric material at a ~~dielectric~~ surface having a contact area greater than a dielectric surface contact area that would be produced by a single pass roughening, wherein the conductive layer is a portion of circuitry of ~~the~~ an electrical device, wherein the conductive layer is comprised of teeth in cavities, a plurality of the teeth ~~that are~~ being within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

.

135. (Canceled)

136. (Currently amended) An electrical device including:

a dielectric material including a surface; and

means for joining a conductive layer built up on the dielectric material sufficiently that separation of the conductive layer from the dielectric material requires destroying integrity of at least one of the conductive layer and the dielectric material, said means for joining comprising filled cavities that form a portion of circuitry of the electrical device~~, wherein the conductive layer is~~ comprised of teeth, a plurality of the teeth ~~that are~~ being within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep, and

wherein at least one of the cavities includes an upgrade slope with respect to the surface of the dielectric material, and one of the teeth engages a portion of the dielectric material at the slope.

.

137. (Canceled)

138. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 5,000 said teeth per linear inch.

.

139. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 10,000 said teeth per linear inch.

140. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 15,000 said teeth per linear inch.

141. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 25,000 said teeth per square inch.

142. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 100,000 said teeth per square inch.

143. (Currently amended) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has a frequency of the teeth sufficient to provide at least 200,000 said teeth per square inch.

144. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 20% of the teeth have a shape that mechanically grips the dielectric material.

145. (Previously presented) The device of any one of claims 91, 97, 101, 108,

110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 50% of the teeth structured obtusely with respect to a line within a plane defined by a surface of the dielectric material that was removed.

146. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 20% of the teeth that are at least 1 tenth of a mil deep.

147. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 50% of the teeth that are at least 1 tenth of a mil deep.

148. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 20% of the teeth that are within the range of 1 tenth of a mil deep to 1.75 tenths of a mil deep.

149. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 50% of the teeth that are within the range of 1 tenth of a mil deep to 2 tenths of a mil deep.

150. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 20% of the teeth that are in the range of 1.5 tenths of a mil deep to 1.75 tenths of a mil deep.

151. (Previously presented) The device of any one of claims 91, 97, 101, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, or 136 wherein:

a sample of the circuitry has at least 50% of the teeth that are in the range of 1.5 tenths of a mil deep to 1.75 tenths of a mil deep.

152. (Previously presented) The device of claim 140, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

153. (Previously presented) The device of claim 141, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

154. (Previously presented) The device of claim 142, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

155. (Previously presented) The device of claim 143, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth

and another of said layers comprising corresponding teeth.

156. (Previously presented) The device of claim 144, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

157. (Previously presented) The device of claim 145, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

158. (Previously presented) The device of claim 146, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

159. (Previously presented) The device of claim 147, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

160. (Previously presented) The device of claim 148, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

161. (Previously presented) The device of claim 149, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth

and another of said layers comprising corresponding teeth.

162. (Previously presented) The device of claim 150, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

163. (Previously presented) The device of claim 151, wherein the circuitry of the electrical device is comprised of multi-layer circuitry, one of said layers comprising said teeth and another of said layers comprising corresponding teeth.

164. (Previously presented) The device of claim 138, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

165. (Previously presented) The device of claim 139, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

166. (Previously presented) The device of claim 140, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

167. (Previously presented) The device of claim 141, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising

corresponding teeth.

168. (Previously presented) The device of claim 142, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

169. (Previously presented) The device of claim 143, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

170. (Previously presented) The device of claim 144, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

171. (Previously presented) The device of claim 145, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

172. (Previously presented) The device of claim 146, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

173. (Previously presented) The device of claim 147, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising

corresponding teeth.

174. (Previously presented) The device of claim 148, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

175. (Previously presented) The device of claim 149, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

176. (Previously presented) The device of claim 150, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

177. (Previously presented) The device of claim 151, wherein the circuitry is comprised of double sided circuitry, one side comprising said teeth and another side comprising corresponding teeth.

178. (Currently amended) A process of making the electrical device product of any one of claims 91, 97, 102, 108, 110, 115, 119, 120, 122, 125, 129, 134, or 136, the ~~method~~ process including:

forming means for joining by building up a conductive layer on a dielectric material surface remaining from removal of a portion of the dielectric material to form a portion of circuitry in the electrical device.

179. (New) The process of any one of claims 1, 7, 12, 18, 20, 25, 29, 30, 32, 35, 37, 39, 44, 46, further including subjecting the dielectric material to a first etching of the dielectric material and a second etching of the dielectric material.

180. (New) The device of any one of claims 91, 97, 102, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, 136, wherein the dielectric material is non-homogeneous.

181. (New) The device of any one of claims 91, 97, 102, 108, 110, 115, 119, 120, 122, 125, 127, 129, 134, 136, wherein the metal layer is comprised of a conductive coating.